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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09:863,808	05/22/2001	Wen Lu	S-522,000	8928

7590 10/30/2003

Samuel M. Freund
The Law Offices of William W. Cochran, LLC
3555 Stanford Road, Suite 230
Fort Collins, CO 80525

EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 10/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/863,808

Applicant(s)

SMELA ET AL.

Examiner

Thomas M. Dougherty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-15 is/are pending in the application.
- 4a) Of the above claim(s) 6-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 6-15 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Response to Arguments

Applicant's arguments are not persuasive. The applicant notes that expansion and contraction of the device of Kaneto et al. are not necessarily linear in page 3 of the REMARKS at the top of the page. They also note that the definition of expand does not cite linear expansion-"There is no requirement for linear expansion"- at line 4 of that page. However it is difficult to imagine that this type of expansion would not be covered in the definition of "increase the extent, ..., volume, or scope of" cited by the applicant. Moreover, Kaneto indicates clearly that expansion and contraction of polymers can be made to occur, such as those cited by the applicant; he notes they can be "manipulated to expand or contract", at col. 1, ll. 29-35. He further notes that "This expansion/contraction characteristic of the polyaniline gives rise to its ability to function as an actuator device" at column 5, ll. 1-7. Further he notes that the expansion and contraction does not inherently result in a bending actuator at lines 25-33, but the actuator must be designed with a "material that changes its dimension to a lesser degree than the polyaniline film layer, or more preferably does not change in its dimension to a significant degree, upon being subjected to the conditions that operate the conductive polyaniline as an actuator, therefore providing a reference substrate against which the polyaniline film layer can expand or contract, resulting in a bending of the polyaniline film layer." Thus the natural action of the actuator without the "reference substrate" is linear. And in fact the bend is only the result of a mismatch in expansion qualities between the film and the reference substrate. Consequently, that argument is not persuasive.

Additionally, Mazzoldi et al., authors of "Actuative properties of polyaniline fibers under electrochemical stimulation" (provided by applicant) note in that article that the development of these types of mechanical actuators provide for linear displacement in the first paragraph of the introduction and that it is clearly anticipated they will provide for linear expansion. This is particularly noted in the second column of the introduction, at the last paragraph: "electron conducting polymers (CP) actuators are the most recent entry in the class of materials for direct drive actuators [3-7] and they may lead to useful realizations because of: -large active strain (up to 10% linear)". Thus it is known at a minimum from Mazzoldi et al. that it is desirable to use electrochemical actuators of the type claimed by the applicant for linear expansion/contraction.

The applicant further argues that it is not proper to combine the Kaneto et al. and Satoh et al. references in a 103 rejection at p. 4 of the REMARKS. However note that Kaneto is a principal in both references so it is not that far-fetched that the combination should be made. Additionally, the applicant notes that Kaneto et al. show "a maximum conductivity < 100 S/cm" thereby making it less than the range cited by the Applicant, which as the applicant notes "requires an electrical conductivity of ≥ 100 S/cm". But in reality, the Kaneto et al. reference does read on the claimed range of ≥ 100 S/cm, because, contrary to the Applicant's contention that the maximum conductivity is less than 100 S/cm, in fact the maximum conductivity is 80-100 S/cm, see col. 8, lines 18-20. While it might appear that he teaches away from the claimed range, he in fact overlaps it at the 100 S/cm value. Consequently that argument is not persuasive.

Finally, as to the merit of combining the references, note that the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. *In re Nomiya*, 184 USPQ 607 (CCPA 1975). However there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of the disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin*, 170 USPQ 209 (CCPA 1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. *In re Bozek*, 163 USPQ 545 (CCPA 1969). In this case, such suggestions are presented in the body of the rejections presented below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh et al. article entitled "DEPENDENCES OF ELECTRICAL AND MECHANICAL PROPERTIES OF CONDUCTING POLYPYRROLE FILMS ON CONDITIONS OF ELECTROCHEMICAL POLYMERIZATION IN AN AQUEOUS MEDIUM" which was provided by the Applicant in view of Kaneto et al. (US 5,556,700). Satoh et al. teach

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preparation of polypyrrole films under various polymerization conditions and have been able to increase the electrical conductivity to higher than 500 S/cm by selecting polymerization conditions.

Satoh et al. note using a high-conductivity conjugated polymer at line 3 in the first paragraph of the Introduction.

The high-conductivity conjugated polymer is prepared from a monomer selected from the group consisting of aniline, **pyrrole** (line 4 in first paragraph of Introduction), thiophene, phenylene vinylene, and derivatives thereof.

Satoh et al. do not further describe operations of a specific actuator containing this material or its derivatives which expands linearly.

Kaneto et al. note (col. 1, lines 28-35) in their BACKGROUND OF THE INVENTION discussion of the prior art, an electrochemical actuator comprising a high-conductivity conjugated polymer wherein said element actuates by linear extension/contraction.

Kaneto et al. do not note how their high-conductivity polymer is prepared nor do they note its electrical conductivity range.

It would have been obvious to use the high-conductivity polymer of Satoh et al. in the device described in Kaneto et al. in order to achieve the high electrical and mechanical properties such an electrical conductivity material allows.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh et al. article entitled "DEPENDENCES OF ELECTRICAL AND MECHANICAL PROPERTIES OF CONDUCTING POLYPYRROLE FILMS ON CONDITIONS OF

ELECTROCHEMICAL POLYMERIZATION IN AN AQUEOUS MEDIUM" which was provided by the Applicant in view of Kaneto et al. (US 5,556,700). Given the combined invention as noted above, said combination does not note specific derivatives that generate high-conductivity conjugated polymers when polymerized.

Kaneto et al. however in their DETAILED DESCRIPTION OF THE INVENTION at col. 2, ll. 57-64 use of derivatives including alkyl in an electrochemical device, which device flexes but does not apparently expand in a linear direction.

It would have been obvious to one having ordinary skill in the art to employ the derivative noted by Kaneto et al. in their invention in the combined device noted above because these materials can be made into controllably deformable actuators as Kaneto et al. note at col. 1, lines 58-63.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

Amel
tmd

July 23, 2003

Thomas M. Dougherty